2000/Access BASIC POCKET GUIDE

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COMMANDS

APPEND-program reference

Appends designated program to current program in work space.

BYE disconnects user from system.

CATALOG [-library name]

Lists the names of all programs and files stored in user's library followed by:

A	ASCII file	U	Unrestricted
F	BASIC formatted file With SWA	P	Protected
		L	Locked
M	BASIC formatted file with MWA	If neither U,P or L, entry is private.	
C	CSAVED program		
Blank	SAVED program		

May optionally specify starting name.

CREATE-file name,file length [,record length]

Creates BASIC formatted file with specified number of records (1-32767). File name may be 1 through 6 alphanumeric characters; must be unique. Optional record length between 64 and 256 words per record may be specified. (Default is 256.)

CSAVE stores a program in semi-compiled form.

DELETE-first statement number [,last statement number]

Deletes specified statement and those that follow, or deletes an inclusive range of statements.

DEVICE prints non-sharable devices to which user has access:

CR	Card reader	JT	Job transmitter
JI	Job inquiry	LP	Line printer
JL	Job lister	MT	Mag tape
JM	Job message	PP	Paper tape punch
JP	Job punch	PR	Paper tape reader
RP	Card reader/punch/interpreter		

Status:		
	BUSY	in use
	N/A	not available for use
	Blank	available for use

ECHO-OFF inhibits echo and allows use of half-duplex terminals.

ECHO-ON reinstates echo and full-duplex.

EXECUTE-program reference

Clears work space, executes specified program, and clears work space on completion.

FILE-file name,designator [,record length]

Associates file name with non-shareable device. Use DEVICE to list devices and maximum record lengths.

FILE-file name,DS,file length [,record length]

Builds a disc-resident ASCII file. File length may be 1 – 32,767 blocks; maximum record length 255 words. (Default is 63.)

GET-program reference

Brings copy of program from library into work space.

GROUP [-library name]

Lists accessible programs and files in the account's group library. Uses CATALOG format.

HELLO-idcode,password [,terminal type]

Logs account on to system. Terminal type codes are:

0 HP 2749A,ASR-33,ASR-38,IBM 2741 (Default)
1 HP 2640A, HP 2644A
2 HP 2640A, HP 2644A in page mode
3 HP 2600A
4 HP 2762A/B, GE TermiNet 300, GE TermiNet 1200
5 ASR-37
6 GE TermiNet 30
7 Texas Instruments Silent 700 Series
8 Execuport 300

KEY returns control to key board after TAPE command.

LENGTH prints number of words in the current program, number of records needed to save program, total records used, and total permitted.

LIBRARY [-library name]

Lists accessible programs and files in the system library. Uses CAT format.

LIST [-P]
LIST [-beginning statement] [,ending statement] [,P]

Lists entire current program or only statements in specified range. P produces page format (56 lines per page).

LOAD-file name

Loads contents of ASCII file into work space as a program.

LOCK-library name

Places the specified program or file in locked state.

MESSAGE-character string

Sends character string of up to 68 characters, preceded by port number, to system operator.

MWA-file name

Gives specified file multiple write access. (Account must have MWA capability.)

NAME[-program reference]

Assigns name to the program currently in work space. If no name specified, previously assigned name is deleted.

PAUSE-time limit

Causes an executing program to cease execution for the number of seconds specified. Time limit must be an integer between 1 and 65535. PAUSE has no effect when executed as a command.

PRIVATE-library name

Places the named file or program in private state.

PROTECT-library name

Places the named file or program in protected state.

PUNCH[-P]
PUNCH[-beginning statement] [,ending statement] [,P]

Punches all of current program or only specified statements on paper tape device or cartridge tape unit at terminal. P produces pagination.

PURGE-library name

Deletes specified program or file from user's library.

RENUMBER[-starting number [,interval [,first statement [,last]]]]

When parameters not specified, renumbers all statements in current program beginning at 10, with intervals of 10. Selected beginning number and interval may be specified; as may statement range to be renumbered.

RUN[-statement number]

Starts program execution at first statement, or at specified statement.

SAVE stores current named program in user's library.

SCRATCH deletes current program from user's work space.

SWA-file name places file in single write access state.

TAPE reads programs from paper tape or cartridge tape unit.

TIME prints: account, port number, time since log on, total time used by account, total time permitted.

UNRESTRICT-library name

Places program or file in unrestricted state.

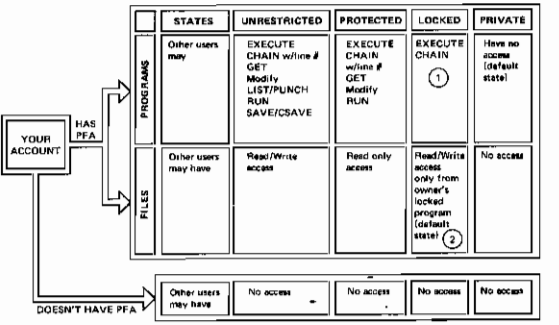
OUT=name specified as parameter in CATALOG, DEVICE, LIST, GROUP, LIBRARY, PUNCH, EXECUTE or RUN directs output to specified device or ASCII file.

ACCOUNT ACCESS CAPABILITIES

PFA – account is available to other users (NOPFA is default).

FCP – group master's account has file create/purge capabilities in libraries in his own group (NOFCP is default).

MWA – selected files in account may be granted MWA status allowing other users to write to those files. (SWA is default).



(1) Group master's locked or private programs may chain to a line number in your locked program if group master has FCP, your account has PFA, and group master's program was run by EXECUTE or CHAIN.

(2) Group master's locked or private programs may create, read, write, purge, assign MWA to locked BASIC formatted files, if group master has FCP, your account has PFA and program was run by EXECUTE or CHAIN.

OPERATOR HIERARCHY

1 ** or ↑ (highest priority)
2 NOT
3 * /
4 + –
5 MIN MAX
6 Any relational operator
7 AND
8 OR (lowest priority)

Left to right for operators at same level. Use parentheses to override above hierarchy. Nested parentheses evaluated inward out.

BASIC PREDEFINED FUNCTIONS

ABS(X)	returns absolute value of X.
ATN(X)	returns arctangent of X.
BRK(X)	X<0 returns Break status. X=0 disables Break. X>0 enables Break.
CHR$(X)	returns ASCII equivalent of numeric value X.
COS(X)	returns cosine of X.
CTL(X)	controls ASCII file output devices. (See Device Control Codes for values of X.)
EXP(X)	returns value of e^X.
INT(X)	returns integer part of expression X.
ITM(X)	returns number of data items from beginning of current record in file X.
LEN(S)	returns the current length of string S.
LIN(X)	X>0 causes carriage return and X line feeds. X=0 causes carriage return only. X<0 no return and ABS(X) line feeds.
LOG(X)	returns natural logarithm ($\log_e x$).
NUM(S)	returns numeric ASCII equivalent of first character in string S.
POS(S_1,S_2)	returns character position in string S_1 where S_2 (if a substring of S_1) starts; else 0.
REC(X)	returns current record number in file X.
RND(X)	generates psuedo random number based on X.
SGN(X)	returns value indicating sign of X: −1 if X<0, 0 if X=0, +1 if x>0.
SIN(X)	returns sine of X.
SPA(X)	spaces X character positions.
SQR(X)	returns square root of X.
SYS(X)	X=0 returns last error number. (0 if none) X=1 returns line number of error. (0 if none) X=2 returns last file accessed. (−1 if none, 0 if terminal) If Break Key disabled, X=3 returns 1 if key was pressed or 0 if not pressed. X=4 returns terminal type.
TAB(X)	moves to character position X.
TAN(X)	returns tangent of X.
TIM(X)	X=0 returns current minute. X=1 returns hour. X=2 returns day. X=3 returns year. X=4 returns second.
TYP(X)	returns 1 for numeric data; 2 for string data, 3 for end of data or file in DATA statement (X=0) or file (X=file number). Returns 4 for end of record if X is negative.
UPS$(S)	upshifts lower-case characters in string S.

DEVICE CONTROL CODES

Line Printer

1	Print and skip to channel 1 (top of form)
2	Print and skip to channel 2 (bottom of form)
3	Print and skip to channel 3 (next line)
4	Print and skip to channel 4 (next double line)
5	Print and skip to channel 5 (next triple line)
6	Print and skip to channel 6 (next half page)

Device Control Codes (cont'd)

7 Print and skip to channel 7 (next quarter page)
8 Print and skip to channel 8 (next sixth page)
9-12 Print and skip to channel 9-12 (installation defined)
13 Print and suppress paper advance
14 Print and advance one line
15 Print and advance two lines
16 Print and advance three lines

Magnetic Tape Unit

20 Skip forward to tape mark
21 Skip to following file
22 Skip backward to tape mark
23 Skip to preceding file
24 Rewind

ASCII Disc File

24 Logical rewind on file

Tape Punch

30 Even parity; X-OFF, CR, LF form record separator
31 Odd parity; X-OFF, CR, LF form record separetor
32 Parity bit zero, X-OFF, CR, LF form record separator
33 Binary output; no change in parity bit; no record separator

Tape Readers

30 Read data with even parity and with CR as record separator
31 Read data with odd parity and with CR as record separator
32 Read data, ignore parity and with CR as record separator (default mode)
33 Read data with no parity check and no record separator

Card Reader

40 Read ASCII card image (default)
41 Read column binary image
42 Read EBCDIC card image

Reeder/Punch/Interpreter

40 Read ASCII card image (default)
41 Read column binary image
42 Read EBCDIC card image
43 Feed a card into reader
44 Punch hollerith code on card (default)
45 Punch column binary code
46 Select hopper 1 (default)
47 Select hopper 2
48 Select stacker 1 (default)
49 Select stacker 2
50 Punch and print same data (default)
51 Punch only
52 Print only
53 Punch and print different data
54 Select stacker overflow mode

ASCII RJE Devices

60 Translate ASCII to EBCDIC or EBCDIC to ASCII (default)
61 Do not translate data

ASCII DECIMAL EQUIVALENTS

NUL	0	+	43	U	85
SOH	1	,	44	V	86
STX	2	-	45	W	87
ETX	3	.	46	X	88
EOT	4	/	47	Y	89
ENQ	5	0	48	Z	90
ACK	6	1	49	[	91
BEL	7	2	50	\	92
8S	8	3	51	]	93
HT	9	4	52	^	94
LF	10	5	53	_	95
VT	11	6	54	`	96
FF	12	7	55	a	97
CR	13	8	56	b	98
SO	14	9	57	c	99
SI	15	:	58	d	100
DLE	16	;	59	e	101
DC1	17	<	60	f	102
DC2	18	=	61	g	103
DC3	19	>	62	h	104
DC4	20	?	63	i	105
NAK	21	@	64	j	106
SYN	22			k	107
ETB	23	A	65	l	108
CAN	24	B	66	m	109
EM	25	C	67	n	110
SUB	26	D	68	o	111
ESC	27	E	69	p	112
FS	28	F	70	q	113
GS	29	G	71	r	114
RS	30	H	72	s	115
US	31	I	73	t	116
SPACE	32	J	74	u	117
!	33	K	75	v	118
"	34	L	76	w	119
#	35	M	77	x	120
$	36	N	78	y	121
%	37	O	79	z	122
&	38	P	80	{	123
'	39	Q	B1	;	124
(	40	R	82	}	125
)	41	S	83	~	126
*	42	T	84	DEL	127

STATEMENTS

ADVANCE #file number,skip count,return variable

Advances the pointer for the specified file past the number of items specified by the skip count. Return variable is set to number of items not skipped. EOR is ignored.

ASSIGN file designator,file number,return variable [,mask] [,restriction]

Assigns file name to file number (1-16).
Return variables may be:

0 file available for read and write
1 file available for read only due to other user's concurrent use
2 read only; it belongs to another and is protected
3 file does not exist or is not accessible
4 file number out of range
5 no buffer space available for the file
6 file not available due to another user's current aecess
7 specified restriction not possible
8 file available for write only

Aecess Restriction Codes

RR Read and Write restriction, no other user can access file.
WR Write restriction (default case) no other user can write on the file.
NR No restriction (default for MWA files).

ASSIGN*,file number [,return variable]

An asterisk in place of file designator closes the specified file.

CHAIN [return variable,] program designator [,expression]

Loads and runs named program beginning at optional statement number (expression). Return variable: 0 = successful; 1 = bad line number; 2 = no access to named program; 3 = chain is impossible.

COM common list

Creates area for variables in work space that is maintained across chains. Common list is one or more variables, array declarations, or string declarations separated by commas.

CONVERT numeric expression TO destination string

Converts numeric expression into printable ASCII, and stores it in specified string.

CONVERT source string TO numeric variable [,statement #]

Converts string into its numeric form and stores it in the numeric variable. (Control transferred to statement number if string does not contain a number.)

CREATE return variable,file designator,file length [,record size]

Creates a BASIC formatted file with EOF at start of each record with status LOCKED and SWA. Length may be 1 to 32767 records, depending on system. Record size may be 64 to 256 words (default size). Return veriables:

0 successful file creetion
1 file exists with same name
2 unsuccessful; no such account, no such access, bad file name, conflicting action by another user.
3 no space in account
4 no space in system

DATA constant list

Provides data for READ statement to be read from left to right. DATA statements may be located anywhere in program and are considered a continuous list.

DEF function name(parameter) =numeric expression

Defines special functions within a program. Up to 26 may be defined: FNA to FNZ. The parameter is a dummy variable, used only in the definition; replaced by actual variable when called.

DIM dimension list

Declares maximum physical size for one or two dimension arrays and strings. String variable followed by length (1-255) in parentheses, array name followed by number of rows or rows and columns in parentheses. Array size must not exceed 5000.

END terminates program execution. Last statement must be END.

ENTER # numeric variable

User's port number (0-31) is returned in numeric variable.

ENTER [#numeric variable,] time allowed, return variable, read variable

Accept data for one read variable, specifies time allowed in seconds (1-255) for data input. Return variable is actual response time (1-255) or –256 for time out, –257 for parity error, –258 for lost character. Optionally, port number is returned.

FILES file list

Reserves a file number (1 – 16) for files to be accessed in program. File numbers are assigned sequentially. If file designator * is used, the file number is reserved for later assignment by ASSIGN.

FOR for variable=initial value TO final value [STEP size]
NEXT for varieble

Repeats statements between matching FOR and NEXT statements, starting with a specified initial value and moving to the final value by an optionally specified step. Default step is 1. FOR-NEXT statements may be nested to any level, but may not overlap.

GOSUB statement number

Transfers program control to a specified subroutine. RETURN in subroutine returns control to statement following GOSUB. May be nested to 20 levels.

GOSUB numeric expression OF statement number list

Multibranch GOSUB evaluates numeric expression to an integer, n, then branches to nth statement number in list.

GOTO statement number

Transfers control to specified statement number.

GOTO numeric expression OF statement number list

Multibranch GOTO evaluates numeric expression to an integer, n, then branches to nth statement number in list.

IF relation THEN statement number

If relation following IF is true, transfers control to specified statement number. If false, continues with next sequential statement.

IF END #file number THEN statement number

Sets trap so that if an EOF condition occurs in reading or writing that file, control transfers to statement number. Trap address once set remains valid throughout program (until file re-assigned).

IF ERROR THEN statement number

Execution of IF EROR sets flag so that subsequent error messages are trapped. If error occurs, control transfers to statement number. If error is warning only, no transfer is made. Error number is returned through SYS function.

IMAGE format string

Specifies unquoted format string for a PRINT USING or MAT PRINT USING statement.

INPUT read variable list

Requests input at terminal during program execution. Prints a question mark prompt, then accepts numeric or string input from terminal separated by commas. If insufficient items are input, the system prompts with ??.

[LET] replacement variable=numeric or string expression

Assigns value on the right side of assignment operator (=) to variable on the left. Multiple variables mey be assigned numeric, but not string, value.

LINPUT destination string

Accepts an entire line of string data including any quotes from the terminal and assigns it to a destinetion string. No prompt character is printed.

LINPUT #file number;destination string

Reads the contents of the next available record from an ASCII file or user terminal into a destination string.

LOCK # file number [,return variable]

Sets or tests file status flag. Prevents simultaneous access to a file. Return variable indicates: 0 = lock was successful; 1 = file already locked; 2 = file number out of range.

MAT array name=array name+array name

Sets an array equal to the sum of two arrays of the same dimensions.

MAT array name=array name-array name

Sets an array equal to the difference of two arrays of the same dimensions.

MAT array name=array name 1 * array name 2

Sets an array equal to the product of two different arrays.

MAT array name=(numeric expression)*array name

Scalar multiplication sets an array equal to the product of a number and an array.

MAT array name=array name

Sets one array equal to another array of the same dimensions.

MAT array name=CON[(new dimensions)]

Sets up an array with all elements equal to one.

MAT array name=IDN[(new dimensions)]

Used to establish an identity array (all zeros with a diagonal of all ones).

MAT array name=INV(array name)

Inverts a square array.

MAT array name=TRN(array name)

Sets first array to transposition of second array.

MAT array name=ZER[new dimensions]

Sets all elements of the specified array to zero.

MAT INPUT array read list

Permits entire array to be entered at the terminal. Array list is one or more array names, separated by commas.

MAT PRINT array print list [print delimiter]

Prints entire arrays in a single statement. Array print list contains array names and/or print functions separated by commas or semicolons.

TAB - tabs to column position
LIN - generates a line feed
SPA - spaces
CTL - outputs special device control commands

MAT PRINT #file number [,record number] ;END
MAT PRINT #file number [,record number] ;array write list [print delimiter]

Prints arrays row by row. END writes EOF mark.

MAT PRINT USING format part [;array print list]

Formats output of data from arrays. Format part is format string or statement number. Array print list contains array name and/or print functions.

MAT PRINT #file number;USING format part;array print list

Formats the printing of arrays to ASCII files or to a terminal.

MAT READ array read list

Reads entire arrays from DATA statements. Array read list is array names separated by commas.

MAT READ #file number [,record number] ;array read list

Reads array data from a file, optionally beginning at specified record.

PRINT [print list [print delimiter]]

Prints data at terminal. Print list contains expressions and/or print functions. Delimiter is comma to space items in 15 column fields; semicolon to pack items.

TAB(X)	moves carriage right to specified column (0-71). Generates CR,LF if >71.
SPA(X)	moves carriage right specified number of spaces. Generates CR,LF if >71.
LIN(X)	generates CR and specified number of line feeds; if negative, no CR; if zero no LF.
PRINT	prints one empty line.

PRINT #file number [,record number] [;END]

Writes data and control information to BASIC formatted or ASCII file; or if file number is zero, to terminal. END writes EOF mark. Record number writes specified record to BASIC formatted file.

PRINT #file number [,record number] ;write list [print delimiter] [;END]

Writes data and control information in write list to BASIC formatted or ASCII file, or to terminal if file number is zero. Record number writes to specified record in BASIC formatted file (direct access). END writes EOF mark.

PRINT USING format part ;using list

Formats printed output. Format part is a quoted string, a string variable, or an IMAGE statement number. Using list specifies items to be printed. See Print Using Format Specifications.

PRINT #file number;USING format part ;using list

Formats output to ASCII files, or terminal if file number is zero. Format part is a quoted string, a string variable, or an IMAGE statement number. Using list specifies items to be printed. See Print Using Format Specifications.

PURGE return variable, file designator

Purges an ASCII or BASIC formatted file. Return variable: 0 = successful purge; 1 = file busy; 2 = file not accessible; 3 = no such file.

READ read variable list

Reads numeric or string items from DATA statements and assigns them to named variables.

READ #file number [,record number] [;read list]

Serial READ reads items from the current file pointer until the read list is exhausted. Direct READ reads from the beginning of the specified record. A direct READ without read list positions file pointer to the beginning of the specified record.

REM [remark]

Places remarks in program listing.

RESTORE [statement number]

Resets data pointer to specified DATA statement. If none specified, resets to lowest numbered DATA statement.

RETURN returns control from GOSUB branch to statement immediately following last GOSUB executed.

STOP terminates executing program.

SYSTEM return variable, source string

Executes following commands from a running program: BYE, ECHO, FILE, LOCK, MESSAGE, MWA, PAUSE, PRIVATE, PROTECT, SWA, UNRESTRICT. Return variable: 0 = successful completion; 1 = unsuccessful.

SYSTEM destination string, source string

Executes following commands from a running program: CATALOG, GROUP, LIBRARY, TIME, LENGTH.

UNLOCK #file number [,return variable]

Releases file from the LOCK condition. Return variable: 0 = unlock successful; 1 = file already unlocked; 2 = file number out of range.

UPDATE #file number; numeric expression (or source string)

Replaces the next sequential data item in BASIC formatted file with the value of numeric expression or source string.

PRINT USING FORMAT SPECIFICATIONS

Carriage Control Characters

+ suppress linefeed
- suppress carriage return
suppress carriage return and linefeed

If supplied, the carriage control character must be followed by a comma and at least one slash, format specification, or group. The specified action occurs at the completion of the statement. If the carriage control character is not supplied, the default action is an X-OFF, carriage return followed by a linefeed.

Format Characters

A format string consists of an optional carriage control character and comma followed by one or more format specifications or groups of format specifications separated by commas and/or slashes. Each format specification is either a literal string or an orderly combination of format characters.

A	ASCII character
D	Decimal character
.	Decimal point
X	Blank character
S	Sign character

An optional repetition factor (replicator), between 1 and 255 inclusive, may precede an A, X, or D.

Delimiters

Format specifications must be separated with either a comma or a slash. A comma serves only as a delimiter whereas a slash also causes an X-OFF, carriage return, and linefeed to be output. Commas may appear only between format specifications and may not be adjacent. Slashes may appear before, after, and in place of format specifications as well as between them and may be adjacent to commas. Multiple slashes are allowed but a slash may not be preceded by a replicator.

Groups

A group of one or more format specifications may be enclosed in parentheses which must be preceded by a repetition factor between 1 and 255 inclusive. Within the parentheses, the specifications must be separated by commas or slashes and the group must be set off from other specifications by a comma or slashes, just as if it were a single specification. Groups can be nested two levels deep.

Replicators

An unsigned positive integer between 1 and 255 inclusive must precede the left parenthesis of a group and may optionally precede any X, D, or A in a format specification. It indicates the number of times that the following character or group is to be repeated. Leading zeros are allowed.

Format Specifications

There are three catagories of format specifications: those containing at least one D, those containing at least one A, and those consisting of either a literal string or all Xs. Ds and As may not appear in the same format specification.